

1 Introduction

- The aim of this study is to explore the semantic/pragmatic nature of the necessity modal *-nakereba naranai* in Japanese, which is widely thought to take a deontic reading, as exemplified in (1) (e.g. Narrog 2009, Larm 2006, Kaufmann 2017, Kaufmann & Tamura to appear).

- (1) Kimi-wa gakko-e ika-nakereba-naranai yo. [*canonical deontic*]
 you-TOP school-to go-NN SFP
 ‘You should/must go.’

We can see that *-nakereba naranai* admits of a certain reading that is distinct from, but easily confused with, the epistemic flavor of modality, which I call the *pseudo-epistemic reading* (Yalcin 2016).

- (2) [A thirsty man opens the refrigerator and picks up a beer]
 Biiro-wa (imagoro) hie-tei-nakereba-naranai. Sikasi, hie-tei-nai. [*pseudo-epistemic*]
 beer-TOP (by.now) get.cold-PROG-NN but get.cold-PROG-NEG.
 ‘The beer should be cold by now, but it isn’t.’

The speaker is not saying that in bouletically preferred situations, the beer is cold; we do not have here any canonical deontic reading of the necessity modals. Instead, it seems like we have a paradigm case of the putative epistemic reading.

- ▷ **Basic Question:** How can we give an account of the pseudo-epistemic reading of *-nakereba naranai*? Is the pseudo-epistemic reading really ‘pseudo-epistemic’ in the first place?

The upshot: *-Nakereba naranai* is interpreted as expressing universal quantification over *normality* rather than Kratzerian modal base and ordering source.

2 *Must, should, and -nakereba naranai*

- *-Nakereba naranai* is sometimes glossed as the ‘weak’ necessity *should* or the ‘strong’ necessity *must* in English (e.g. Larm 2006). I show that, however, it should not be treated as fossilized in this way. First, both sentences with *-nakereba naranai* and *should* can pattern with pseudo-epistemic readings whereas sentences with *must* cannot (cf. (2)):¹

- (3) a. #The beer must be cold by now, but it isn’t.
 b. The beer should be cold by now, but it isn’t. (Copley 2006: 5)

Second, while sentences with *should* can pattern with the *weak* (or *acquiescence*) reading, a reading which can be interpreted like possibility modals *can* or *may* (Wilson & Sperber 1988, Kaufmann 2012, von Fintel & Iatridou 2017, a.o.), sentences with *must* and *-nakereba naranai* cannot:^{2 3}

¹It is not just that the speaker uttering *-nakereba naranai(p)* and *should(p)* can continue that they can continue by asserting that *not-p* is true (thus entailing that *p* is false), but (s)he can also continue that have no idea whether *p* (Copley 2006:4–5):

(i) Biiro-wa hie-tei-nakereba-naranai ga, ima dou-da-ka wakara-nai.
 beer-TOP get.cold-PROG-NN but now whether know-NEG.

‘The beer should be cold by now, but I have absolutely no idea whether it is.’

(ii) The beer should be cold by now, but I have absolutely no idea whether it is.

(cf.) #The beer must be cold by now, but I have absolutely no idea whether it is.

²Note that in (5b,c), the licensing of the FCI (free choice items) “*doredemo*” ‘whatever’ ensures that the sentence is uttered in weak contexts (Giannakidou & Quer 2013, Halm 2017).

³Another piece of evidence that *must* and *-nakereba naranai* stay strong i.e. they do not have the weak readings is that they encode the *maximal* confidence of the truth of the preadjacent. von Fintel & Gillies (2010) claim that in the case in (ia) below, if *must* makes weak statement, it cannot occur in the final conjunct since the ball is 100% likely to be in C. The same reasoning holds for *-nakereba naranai*, as shown in (ib).

(i) [The speaker knows that a ball is either in A, in B, or in C.]

a. [The speaker knows that a ball is either in A, in B, or in C.]

The ball is in A or in B or in C. It is not in A... It is not in B. So, it *must* be in C. (von Fintel & Gillies 2010: 14)

- (4) A: May I open the window?
 a. B: Sure. #You must open the window, if you are hot. ($\not\approx \diamond$)
 b. B: Sure. You should open the window, if you are hot. ($\approx \diamond$) (von Fintel & Iatridou 2017: 293)
 c. B: Motiron. #Mosi atui-no nara, mado-o ake-nakereba-naranai (yo). ($\not\approx \diamond$)
 sure if hot-C then window-ACC open-NN (SFP).
 ‘Sure. You should open the window, if you are hot.’
- (5) a. Please take a seat. #You must eat whatever you want. ($\not\approx \diamond$)
 b. Please take a seat. You should eat whatever you want. ($\approx \diamond$)
 c. Osuwarikudasai. #Doredemo tabetaimono-o tabe-nakereba-narimasen. ($\not\approx \diamond$)
 take.a.seat.HON whatever thing.you.want.to.eat-ACC eat-NN.HON
 ‘Please take a seat. You should eat whatever you want.’

Putting it all together:

▷ *-Nakereba-naranai* seems to be strong but allows pseudo-epistemic readings.

	weak readings	pseudo-epistemic readings
<i>must</i>	#	#
<i>should</i>	✓	✓
<i>nakereba-naranai</i>	#	✓

Table 1: Properties of necessity modals

3 Difficulties

3.1 Pseudo-epistemic readings are not true epistemic readings

- A motivation for assuming non-deontic *nakereba-naranai* as a pseudo-epistemic modal rather than a true epistemic one is that no modal which is uncontroversially epistemic works in pseudo-epistemic sentences: if (6a) were true epistemics, it would on any account obviously entail the epistemic readings of (6b,c) (cf. Kaufmann 2017: fn. 14, Kaufmann & Tamura t.a.: 14–15).⁴

- (6) a. Biiru-wa hie-tei-nakereba-naranai. Sikasi, hie-tei-nai.
 beer-TOP get.cold-PROG-NN but get.cold-PROG-NEG.
 ‘The beer should be cold by now. But it isn’t.’
- b.#Biiru-wa hie-tei-ru-{kamosirenai/nitigainai}. Sikasi, hie-tei-nai.
 beer-TOP get.cold-PROG-PRES-may.be/must.be but get.cold-PROG-NEG.
 ‘The beer {may/must} be cold by now. But it isn’t.’
- c.#Biiru-wa {tabun/matigainaku} hie-tei-ru. Sikasi, hie-tei-nai.
 beer-TOP probably/certainly get.cold-PROG-PRES but get.cold-PROG-NEG.
 ‘The beer is probably/certainly cold by now. But it isn’t.’

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- b. Ball-wa A-ka B-ka C-ni aru. A-ni nai. B-ni nai. Yotte, C-ni *nakereba-naranai*.
 ball-TOP A-or B-or C-in exist. A-in not.exist B-in not.exist so C-in exist.NN

‘The ball is in A or in B or in C. It is not in A... It is not in B. So, it must be in C.’

Moreover, if *must* and *-nakereba naranai* can encode weakness of the speaker’s confidence, Alex in (iib)/(iii) can avoid blame as in the case of *should* in (iia), although they cannot:

- (ii) Alex: It {(a) *should*/(b) *must*} be raining.
 Billy: [Opens curtains] No, it’s not. You were wrong.
 Alex: $\sqrt{(a)}/\#(b)$ I was not! Look, I didn’t say it *was* raining. I only said it {**should**/**must**} be raining. Stop picking on me!
- (iii) Alex: *Ima soto-wa ame-ga futtei-nakereba-naranai*. ‘It must be raining out now.’
 Billy: [Opens curtains] *Futtei-nai yo. Kimi-wa machigatteiru*. ‘No, it’s not. You were wrong.’
 Alex: *??Boku-wa ame-ga futtei-nakereba naranai-to itta dake-da. Ame-ga futteiru-to-wa ittei-nai*.
 ‘I only said it *must* be raining. I didn’t say it *was* raining.’

⁴ English weak necessity *should* and *ought* shows the same behavior (Copley 2006: 6).

- (i) a. The beer {should/ought to} be cold by now, but it isn’t.
 b.#The beer {may be/might be/is probably} cold by now, but it isn’t.

3.2 Stay within Kratzerian paradigm?

- Can't we just say that the pseudo-epistemic reading corresponds to the combination of *circumstantial modal base* with a *stereotypical ordering source* in line with Kratzer (1981/1991)?

On Kratzer's system, modals induce quantification over some partially ordered, restricted class of worlds, which are generally fixed by two ingredients: a *modal base* and an *ordering source*. The modal base fixes the restricted class of worlds quantified over, as a function of the evaluation world: this will just be the set of worlds making all the propositions delivered by the modal base true (the intersection of the propositions given by the modal base). The ordering source yields sets of propositions characterizing 'what is required/aimed for/wished for,' and then it induces an order on the worlds in the domain.

In her paradigm, the pseudo-epistemic reading of necessity modals corresponds to the worlds as follows:

- The quantification introduced by the speaker's modal operator is restricted to the worlds that hold fixed certain circumstances obtaining in the actual world. e.g. in (2): 'the beer was in the refrigerator', 'the speaker opened the refrigerator door', 'the beer wasn't cold', etc.
 - The stereotypical conversational background then yields, relative to a world, a set of propositions characterizing the normal course of events in that world. e.g. in (2): 'a refrigerator cools things', 'a beer gets cold when refrigerated', etc.
- Difficulty 1: if the "circumstantial modal bases with stereotypical ordering sources" analysis is correct, the strong necessity like *must* in English should also be able to take the pseudo-epistemic reading, contrary to the fact (: (3)).

The remaining two possibilities, namely (a) *must*-type modals can only take circumstantial readings and cannot the pseudo-epistemic reading (whereas weak necessity can), and (b) on the pseudo-epistemic reading *must* entails its prejacent, are empirically rejected. See Yalcin (2016: 240–241).⁵

- Difficulty 2: if the pseudo-epistemics involve a circumstantial modal base, it would be natural to expect pseudo-epistemic modal sentences to entail sentences with *can*, a pure circumstantial possibility modal (Kratzer 1981/1991), although they sound odd, as shown in (7):⁶

- (7) a.#The beer can be cold by now. But it isn't. (cf. Yalcin 2016: 242–243)
 b.#Biiiru-wa { hie(tei)-uru / hieru-koto-ga-dekiru } yo. Sikasi, hietei-nai.
 beer-TOP get.cold(.PROG)-can / get.cold-C-NOM-can SFP but get.cold.PROG-NEG.
 '[Lit.] The beer can be cold by now. But it isn't.'

- ▷ The "circumstantial modal bases with stereotypical ordering sources" idea has too many issues to be solved. (At least, we need to say more about the character of 'circumstantial' modal base.)

4 The semantics of normality

- We use the intentional semantics for normality developed in Yalcin (2007, 2016). (cf. Veltman 1996)
 - *Expectation-laden information state* 'i' is modeled as a pair of a set $\langle s, \succeq \rangle$ where:
 - *s* is the *information state* which reflects a possible stance on what the facts are.
 - \succeq is an *expectation pattern* which reflects a view on what is normal. ('at least as normal as')

⁵Yalcin claims that either (a) and (b) seems unexpected from the point of view of the Kratzerian analysis. From a theoretical point of view, the proposal (b) is not motivated because if the set of worlds that pseudo epistemic '*must*' quantify over is some set of worlds that are normal relative to the evaluation world, there is no conceptual reason that the evaluation world needs to be in this set; the world can be very abnormal, even relative to its own standards of normality.

Then how about the option (a)? Yalcin argues that in the context of this account, there is no reason why there should not be a pseudo-epistemic reading of the strong necessity modals—in the way that the Kratzerian system predicts there are e.g. deontic readings of both the strong and weak necessity modals. Thus, the absence of a pseudo-epistemic readings for the strong necessity modals requires explanation in the context of the Kratzerian framework. Yalcin also gives a empirical reason of discomfort with (a). We are considering the hypothesis that the pseudo-epistemic reading corresponds to a circumstantial modal base and a stereotypical ordering source. Then, a pure circumstantial reading of a strong necessity modal should entail a sentence with a pseudo-epistemic weak necessity modal although the evidence for this entailment is slim: neither of the modals in (i) entails of (ii).

(i) I { must/have to } sneeze. (pure circumstantial)

(ii) ?I { ought to/should } sneeze. (pseudo-epistemic)

One may propose that the pseudo-epistemic weak necessity sentences presuppose that their prejacent are false in some of the relevant circumstantial worlds, and this blocks the entailment. Whether or not this suggestion is artificial depends on whether this kinds of constraint applies to other readings of weak necessity modals. However, it seems not to be widely assumed in the deontic case, where strong necessity modals are generally thought to entail the weak ones.

⁶It is fair to say that there is not a tremendous amount of clarity about the nature of circumstantial readings in the literature. Kratzer herself now seems ambivalent about clearly defining this category from a semantic point of view (see Kratzer (2012: 24)).

- We will think of the preorder \succeq as induced by a finite set of proposition N (the normality propositions) taken to characterize a view about what is normally the case:
 $w \succeq v$ iff every proposition in N true at v is true also at w .⁷
- We assume N always contains the logical truth \mathcal{W} (a set of possible worlds). We will call a world *max normal* if the world is in $\bigcap N$, i.e.:

Def 1. A world w is max normal relative to an expectation pattern \succeq , or \succeq -**normal**, iff $\forall w' \in \mathcal{W}$, $w \succeq w'$.

Def 2. The **normal set** relative to an expectation pattern \succeq , n_{\succeq} , is the set of \succeq -normal worlds.

Def 3. An expectation pattern \succeq is **coherent** iff $n_{\succeq} \neq \emptyset$.

- Yalcin (2016: 248) proposes the following semantics for *should*(p) and *must*(p) using the normality framework:

$$(8) \quad \llbracket \textit{should}(p) \rrbracket^{w,i} = 1 \text{ iff } \forall w' \in n_i : \llbracket p \rrbracket^{w',i} = 1$$

$$(9) \quad \llbracket \textit{must}(p) \rrbracket^{w,i} = 1 \text{ iff } \forall w' \in s_i : \llbracket p \rrbracket^{w',i} = 1$$

This makes clear that the basis of the scale between *should* and *must* isn't fundamentally logical but epistemic strength; *should*(p) and *must*(p) are ordered not in terms of (e.g.) subset/superset relations in their domains of quantification, but in terms of epistemic attitude regarding the proposition that p is a necessity.

5 Proposal

- Adopting the normality semantics, I propose the definition of clauses for *-nakereba naranai* as below:

$$(10) \quad \llbracket \textit{nakereba naranai}(p) \rrbracket^{w,i} = 1 \text{ iff } \forall w' \in n_i : \llbracket p \rrbracket^{w',i} = 1$$

As the relation between *should*(p) and *must*(p), *nakereba naranai*(p) and *must*(p) are ordered not in terms of subset/superset relations in their domains of quantification.

▷ Problem: What could be done to make *should* weaker than *-nakereba naranai*? (cf. (4),(5))

- I modify the semantics of *should*(p) (: (8)) as in (11) in order to capture the difference between *-nakereba naranai* and *should*.

$$(11) \quad \llbracket \textit{should}(p) \rrbracket^{w,i} = 1 \text{ iff } \forall w'' \in \mathcal{H}(w' \in n_i, \chi) : \llbracket p \rrbracket^{w'',i} = 1$$

Departing from Yalcin (2016), I use a selection function \mathcal{H} which selects a set of χ -worlds w'' that are closest to $w' \in n_i$ and are desirable or preferable ('what I/you/(s)he want(s)') (Silk 2016, cf. Starr 2010, Grosz 2012).⁸ This ensures that *should*(p) can have the weak (acquiescence) readings, and can also pattern with very closely approximate the strong necessity readings while *nakereba naranai*(p) cannot.

In short, *should*(p) and *nakereba naranai*(p) are different in the capability of reflecting one's subjective desire: *nakereba naranai*(p) can only make a claim about what is normal (or 'the normal course of event'), ignoring the speaker's subjective desire; on the other hand *should*(p) can make not only a claim about what is normal, but about what is normal *with respect to the speaker's preference or desire*.

- The proposal can also predict that both *nakereba naranai/should*-type modals can pattern with pseudo-epistemic readings while *must*(p)-type cannot since the former type modals quantifies the normality set n whereas the latter type modals only depend upon s , which reflects what the facts are.

⁷According to von Fintel & Iatridou (2008), "epistemic ought differs from epistemic *must/have* to in being sensitive not just to the hard and fast evidence available in a situation but also to a set of propositions that describe what is normally the case" (119). While I agree that it is useful to appeal to a set of normality propositions, the idea of taking the domain of quantification for pseudo-epistemics to be a subset of the epistemically accessible worlds is problematic, for reasons already reviewed.

⁸Formally, the meaning of 'x thinks φ desirable/preferable' can very closely approximate the semantics of *want* proposed by Geurts (1998) or Villalta (2000) as follows:

(i) $\llbracket x \textit{ wants } \varphi \rrbracket^w = 1$ iff every world in $\text{Dox}_x(w) \cap \varphi$ is better for x in w than every world in $\text{Dox}_x(w) \cap \neg\varphi$. (Geurts 1998)

(ii) $\llbracket x \textit{ wants } \varphi \rrbracket^w = 1$ iff every world in φ is better for x in w than every world each contextual alternative ϕ . (Villalta 2000)

6 Consequences: *-nakereba naranai* and epistemic modals

- We can observe the failure of pseudo-epistemic *nakereba naranai(p)* to entail $\diamond p$ (cf. (6)) by defining the an appropriate notion of consequence. It is instructive to compare (10) to the clauses for the epistemic possibility modals (defended in Yalcin (2007)):

$$(12) \quad \llbracket \diamond p \rrbracket^{w,i} = 1 \text{ iff } \exists w' \in s_i : \llbracket p \rrbracket^{w',i} = 1$$

Yalcin (2016: 248) defines the following definitions of consequence:

Def 4. ϕ is **incorporated** (or accepted, or supported) in an expectation-laden information state i iff for all w in s_i : $\llbracket \phi \rrbracket^{w,i} = 1$

Def 5. ψ is an **informational consequence** of a set of sentences Γ , $\Gamma \models \psi$, just in case: for all information states i that incorporate every $\phi \in \Gamma$, ψ is incorporated in i .

Then, *nakereba naranai(p)* can be incorporated in an expectation-laden information state that rules out p as candidate for actuality (as an epistemic possibility). Therefore *nakereba naranai(p)* $\not\models \diamond p$.⁹

- We can also observe the non-persistent character of modalities of normality (what Veltman (1996) calls *non-monotonic consequence relation*), as shown in (13) and (14) below. That is, if the only relevant information you have is that *nakereba-naranai(p)*, you are in a position to judge, thus allowing to entail *osoraku(p)* ‘presumably(p)’ (: (13)) (Veltman calls this *default* license); if you acquires further information of the appropriate sort, this can defeat the inference (: (14))

(13) Biiru-wa hie-tei-nakereba-naranai.
beer-TOP get.cold-PROG-NN
‘The beer should be cold (normally).’
 \Rightarrow *Osoraku*, biiru-wa hie-tei-ru. ‘Presumably, the beer is cold.’

(14) Biiru-wa hie-tei-nakereba-naranai. Sikasi, (biiru-wa) atatakai.
beer-TOP get.cold-PROG-NN but beer-TOP warm
‘The beer should be cold (normally). But it’s warm.’
 $\not\Rightarrow$ *Osoraku*, biiru-wa hie-tei-ru. ‘Presumably, the beer is cold.’

Following Yalcin, I use the definition of the class of worlds that are most normal within the set of worlds that an expectation-laden information state leaves open. Using this notion of optimality, we can give a semantics for *osoraku(p)* in (15).

Def 6. A world w is **optimal** relative to an information state i , or **i -optimal**, iff $w \in s_i$ and there is no w' such that $w' \succeq_i w$.

Def 7. The **optimal set** relative to an information state i , O_i , is the set of i -optimal worlds.

$$(15) \quad \llbracket osoraku(p) \rrbracket^{w,i} = 1 \text{ iff } \forall w' \in O_i : \llbracket p \rrbracket^{w',i} = 1$$

We can observe that *osoraku(p)* $\models \diamond p$ as in (16) since the optimal set will be a non-empty subset of any non-empty information state.

(16) *Osoraku*, biiru-wa hie-tei-ru. ‘Presumably, the beer is cold.’
 \Rightarrow *Tabun*, biiru-wa hie-tei-ru. ‘The beer *may* be cold.’
 \Rightarrow Biiru-wa hie-tei-ru *kamosirenai*. ‘The beer *might* be cold.’

Since *nakereba naranai(p)* $\not\models \diamond p$, we know *nakereba naranai(p)* $\not\models osoraku(p)$. This the desired result, which captures (14). Still, however, we need to give an account for the default inference in (13).

To consider what patterns of inference are default licensed, we should adopt the notion of consequence that restricts to states of information incorporating the premises and the premises only—states that are informationally minimal. Yalcin defines the notion of *minimal* and *default* as follows:

Def 7. The **minimal states** i incorporating a set of sentences Γ are the states i such that i incorporates every element of Γ , and there is no i' such that (a) i' incorporates every element of Γ , and (b) $s_i \subset s_{i'}$.

⁹One can of course have the view that the world one inhabits is not among the most normal possibilities. An expectation-laden information state reflects such a view when the set of worlds left open by the information state is disjoint from the normal set determined by its expectation pattern. In this kind of case, the information one has rules out the possibilities that are max normal.

Def 8. ψ is an **default consequence** of a set of sentences Γ , $\Gamma \models_D \psi$, just in case all the minimal states incorporating Γ incorporate ψ . (Yalcin 2016: 249)

In the default situation as in (13), the minimal states incorporating the premise are those where the information state component is just \mathcal{W} , a set of possible worlds. These are all the states i such that the proposition that the beer is cold true throughout n_i . At these states n_i coincides with O_i , so the inference is licensed.

7 A note on deontic readings: deontics as *norms*

- How can we give a unified account of the canonical deontic reading and the pseudo-epistemic reading of *-nakereba naranai*?

Horty (2012) provides some illuminating analyses of deontic *oughts* using the resources of *default logic*, which are akin to the normality semantics of Yalcin (2016). Default logic can be used to encode what conclusions are epistemically default licensed given some information e.g., the default rule corresponding to *Birds fly* recommends the conclusion that x flies, given the information that x is a bird ($\text{bird}(x) \rightarrow \text{fly}(x)$). Horty claims that such rules can also be used to capture which *actions* are default licensed given some information, e.g., the default rule corresponding to *Keep your promises* recommends that I show up, given that I promised to. He uses the latter application to clarify the deontic *ought* (or *should*): to say ‘ p ought to be the case’ is to say that ‘the realization of p is default recommended’.

- Together with the work above, this would seem to suggest the direction of a unified treatment of deontic and pseudo-epistemic *-nakereba naranai* as devices for expressing normality (in Horty’s term, ‘defaults’) e.g., to say “Kimi-wa gakkō-e ika-nakereba-naranai.” ‘You must go to school.’ is to say that the realization of *you go to school* is ‘normal’.

8 Concluding remarks

- *-Nakereba naranai* quantifies over normality rather than Kratzerian conversational backgrounds.
 - ▷ We should reconsider “modal bases” and “ordering sources,” at least as they are currently understood.
- Primary goals for future development of the account:
 - work through how the data and the analysis could be accounted for (or refined) from the viewpoints of the compositional/conditional approaches (Akatsuka 1992, Fujii 2004, Kaufmann 2017)
 - unify the account of *-nakereba naranai* with the other deontic expressions e.g. *beki* ‘should’.

Acknowledgements

I would like to thank those who were kind enough to provide me with their felicity judgements on the examples. All errors are my own. This research has been supported by JSPS KAKENHI (17J03552).

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